New Forest
DISTRICT COUNCIL

Fawley

Air Quality Action Plan 2008

EXECUTIVE SUMMARY

This document is the draft Action Plan for Fawley.

The Action Plan has been produced following the review and assessment of air quality in the New Forest. This process determined the likely exceedance of the 15 minute mean objective for sulphur dioxide in Fawley village. As a result New Forest District Council had a duty to declare an Air Quality Management Area in Fawley and prepare an Action Plan.

The main aim of the Action Plan is to present options which, if implemented, should reduce short term sulphur dioxide concentrations in pursuit of the sulphur dioxide 15 minute mean objective.

The Action Plan confirms the likely source of sulphur dioxide is from local industrial sources.

Options discussed range from industrial schemes, which are mainly based on the new permit for Esso Petroleum Ltd., to formalising the relationships between industry, the regulator (the Environment Agency), New Forest District Council and the public.

The Action Plan has been put out to consultation to all interested parties, and a summary of comments received has been included in the Action Plan. It is acknowledged that the Action Plan is a continuously evolving document involving numerous groups and Authorities which may require revision in the future.

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1.0 INTRODUCTION

1.1 Local Air Quality Management

The management of local air quality is a statutory requirement under the Environment Act 1995. Part IV section 80 of this Act places a responsibility on Local Authorities to continuously review and assess air quality in their district.

The review and assessment of local air quality is undertaken by utilising modelling and monitoring techniques to determine if objectives and target dates set for seven pollutants are likely to be met. The air quality objectives for the seven pollutants are shown in Table 1.

If through the review and assessment process it is found that a pollutant is unlikely to meet its objective, the Local Authority has a duty to declare an Air Quality Management Area. Following such a declaration an Action Plan must be prepared, the main aim of which is to state how the Local Authority intends to improve air quality in pursuit of the objective within the Air Quality Management Area.

This particular Action Plan targets the exceedance of the 15 minute mean objective for sulphur dioxide (highlighted in red in Table 1) in the village of Fawley. This objective states that the 15 minute mean concentration must not be exceeded more than 35 times a year.

New Forest District Council is continuing to fulfil its legal obligations through monitoring and assessing the seven pollutants against the set air quality objectives.

Table 1

Table showing the UK Air Quality Objectives

Pollutant	Air Quality Objective
Benzene	16.25 μg/m^3 or less, when expressed as a running annual mean to be achieved by December 31st 2003
	5.0 μg/m^3 or less, when expressed as a running annual mean to be achieved by December 31st 2010
1,3 Butadiene	2.25 μg/m^3 or less, when expressed as a running annual mean to be achieved by December 31st 2003
Carbon Monoxide	10.0 mgm^3 or less, when expressed as a running 8 hour mean to be achieved by December 31st 2003
Lead	0.5 μg/m^3 annual mean to be achieved by December 31st 2004
	0.25 μg/m^3 annual mean to be achieved by December 31st 2008
Nitrogen Dioxide	200 μg/m^3 when expressed as an hourly mean not to be exceeded more than 18 times a year to be achieved by 31st December 2005.
	40 μg/m^3 when expressed as an annual mean to be achieved by 31st December 2005.
PM_{10}	50 μg/m^3 or less when expressed as a 24hr mean not to be exceeded more than 35 times a year to be achieved by 31st December 2004.
	40 μg/m^3 or less when expressed as an annual mean to be achieved by 31st December 2004.
Sulphur Dioxide	125 μg/m^3 or less, when expressed as a 24 hour mean, not to be exceeded more than 3 times per year, to be achieved by 31st December 2004.
	350 μg/m^3 or less when expressed as an hourly mean, not to be exceeded more than 24 times a year, to be achieved by 31st December 2004.
	266 μg/m^3 or less when expressed as a 15 minute mean not to be exceeded more than 35 times a year, to be achieved by 31st December 2005.

1.2 The Review and Assessment Process

The review and assessment process is a three year continuous cycle of assessment and reports. This is achieved through a phased approach to the process which ensures that Local Authorities only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. It is not envisaged that every Local Authority will need to proceed beyond the first step.

Previous air quality reports can be viewed and downloaded from the New Forest District Council website; www.newforest.gov.uk/index.cfm?articleid=185

The Review and Assessment process can be summarized as follows;

Step 1 – Updating and Screening Assessment

The Updating and Screening Assessment is the first step of the air quality review and assessment process. The aim is to identify those matters that may have changed since the last review and assessment, and which might lead to a likelihood of an air quality objective being exceeded.

Step 2 – Detailed Assessment

A Detailed Assessment is only required if the Updating and Screening Assessment concludes there is a likelihood of an exceedance of an air quality objective.

The aim of a Detailed Assessment is to provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of Air Quality Management Areas.

If following the Detailed Assessment there is evidence of a likely exceedance of an air quality objective, the Local Authority has a duty to declare an Air Quality Management Area for the pollutant of concern, after which targeted reports relating to the Air Quality Management Area are required, namely;

(i) Further Assessment

A Further Assessment of the Air Quality Management Area is made 12 months after the declaration of the area to validate the decision to declare the Air Quality Management Area and proportion the source(s) of the pollution.

(ii) Action Plan

The overall aim of declaring the Air Quality Management Area is to produce an Action Plan within 18 months of the declaration. The aim of the Action Plan is to outline the Authority's plans to attempt to reduce the pollutant concentration in pursuit of the relevant air quality objective. The Action Plan will often involve other regulatory authorities for example the County Council with regards to transport related issues or, as in this case, the Environment Agency as regulator for many of the industrial processes within New Forest district.

Step 3 – Progress Report

A Progress Report is required if there is no requirement to proceed to a Detailed Assessment following the Updating and Screening Assessment, and in the year following a Detailed Assessment.

The aim of a Progress Report is to update monitoring results from the previous year.

1.3 Aims of the Air Quality Action Plan

This report is the draft air quality Action Plan for Fawley and follows the declaration of an Air Quality Management Area for the majority of Fawley village in respect of the exceedance of the 15 minute mean objective for sulphur dioxide. The Action Plan is a working document involving the Local Authority, other regulatory bodies and the local community. The overall aim is to attempt to reduce short term sulphur dioxide concentrations within the Air Quality Management Area in pursuit of the 15 minute mean objective for this pollutant.

Therefore the Action Plan, whilst being led by the Local Authority, attempts to engage communities to tackle the issue of local air quality. The more localised options presented in an Action Plan are often the most effective in terms of improvement in air quality and cost. The Action Plan will also assist the Local Authority in maintaining any reductions in pollutant concentrations and in the process improve air quality within its district.

The aims of this Action Plan are;

- to quantify the source contributions to the predicted exceedance of the 15 minute mean objective for sulphur dioxide in order to target the action

- to consider all available options in terms of effectiveness, cost and feasibility

- to quantify the expected impacts of each option and if possible indicate if the options will be sufficient to meet the relevant air quality objective

- to demonstrate the Local Authority has worked with other interested parties and used its legislative powers where necessary in pursuit of meeting the Air Quality objectives

- to determine realistic timescales in which to implement any options

- to state how the Local Authority intends to monitor and assess the effectiveness of the Air Quality Action Plan

2.0 REVIEW AND ASSESSMENT OF AIR QUALITY IN FAWLEY

In order to determine which air quality options are worth progressing within the Action Plan, the air quality issues in Fawley firstly need to be outlined.

2.1 Fawley

Fawley is a village on the south eastern edge of the New Forest district. The village is situated on the mouth of Southampton Water which links the river Test and Southampton Docks to the Solent.

Fawley Parish includes the villages of Fawley, Holbury, Calshot, Blackfield and Langley and comprises 14,334 residents (based on Census 2001 figures). Fawley village contains local businesses, including a post office and public house, village hall and local school. Fawley is also closely linked with other communities on Southampton Water, collectively known as the Waterside, including Marchwood, Holbury and Hythe.

In addition to the local communities, the Waterside area (including Fawley village) has large industrial processes located within it, the majority of which are on the coast line of Southampton Water. This area is shown on the map on page 13.

The industries include a power station, refinery, chemical plants and processes, incinerator and energy from waste plant. All these processes are permitted by the Environment Agency under the Pollution Prevention and Control (England and Wales) Regulations 2000, as amended, (the PPC Regulations)**.** In total there are 12 permitted processes on the Waterside between Calshot and Hythe.

The close proximity of industrial processes to residential areas has on occasions resulted in localised complaints, however on the whole the mix of industrial premises and residential properties function well together. Historically the industrial processes have provided employment and contributed to the development of the local communities since the 1920's when the first industrial process (the oil refinery) was built on the Waterside.

The processes in the vicinity of Fawley village are as follows;

Esso Petroleum Ltd

Oil refinery located 0.5km from Fawley village centre to the west through to the north of Fawley, with the boundary of the refinery being approximately 100m west of the closest properties in Fawley.

ExxonMobil Chemical Ltd

Organic chemical plant located on the Esso Petroleum oil refinery site.

npower Cogen Ltd (Esso Petroleum)

Combustion process located on the Esso Petroleum oil refinery site.

Ondeo Nalco

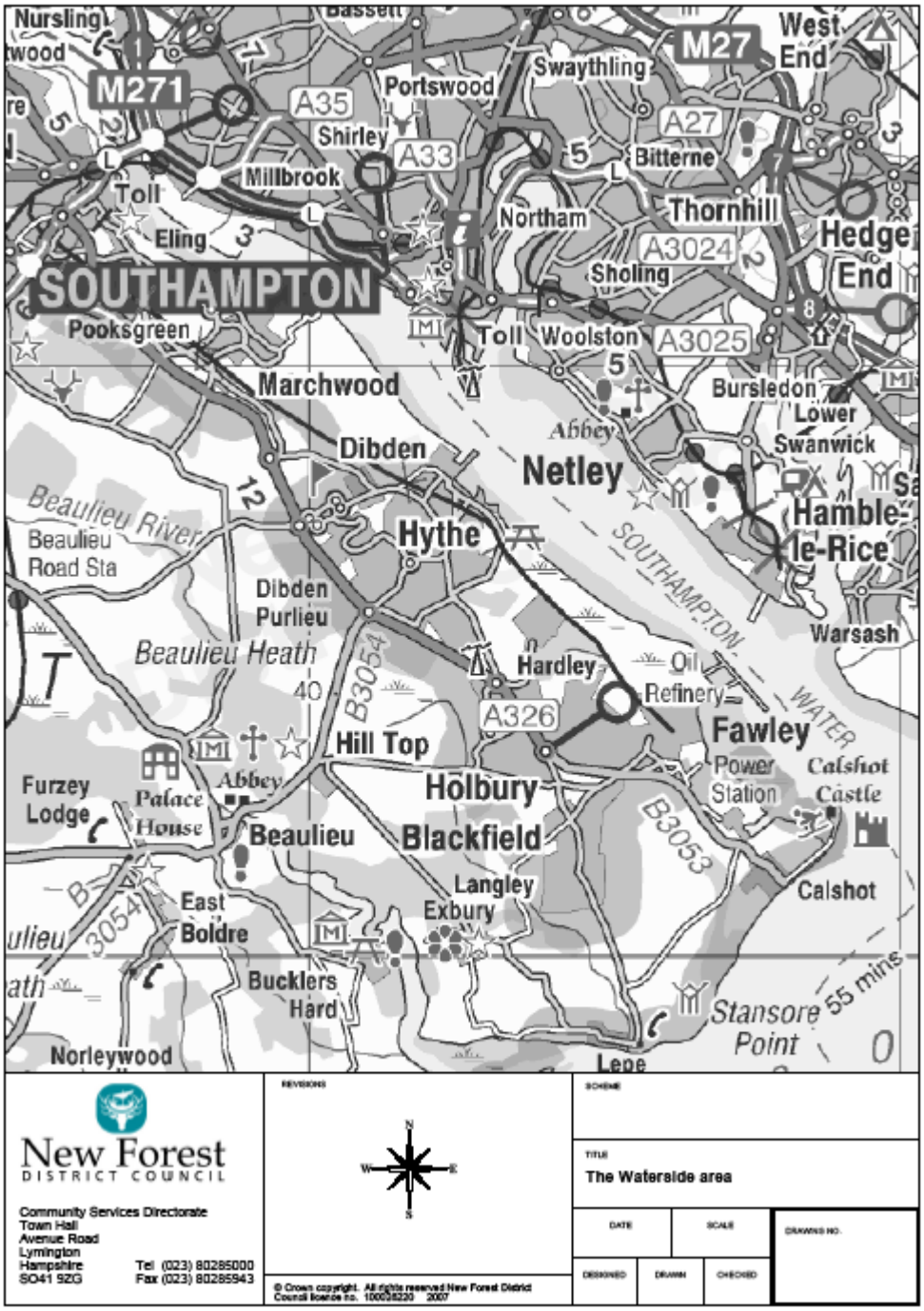
Organic chemical plant located on the Esso Petroleum oil refinery site.

RWE npower Power Station

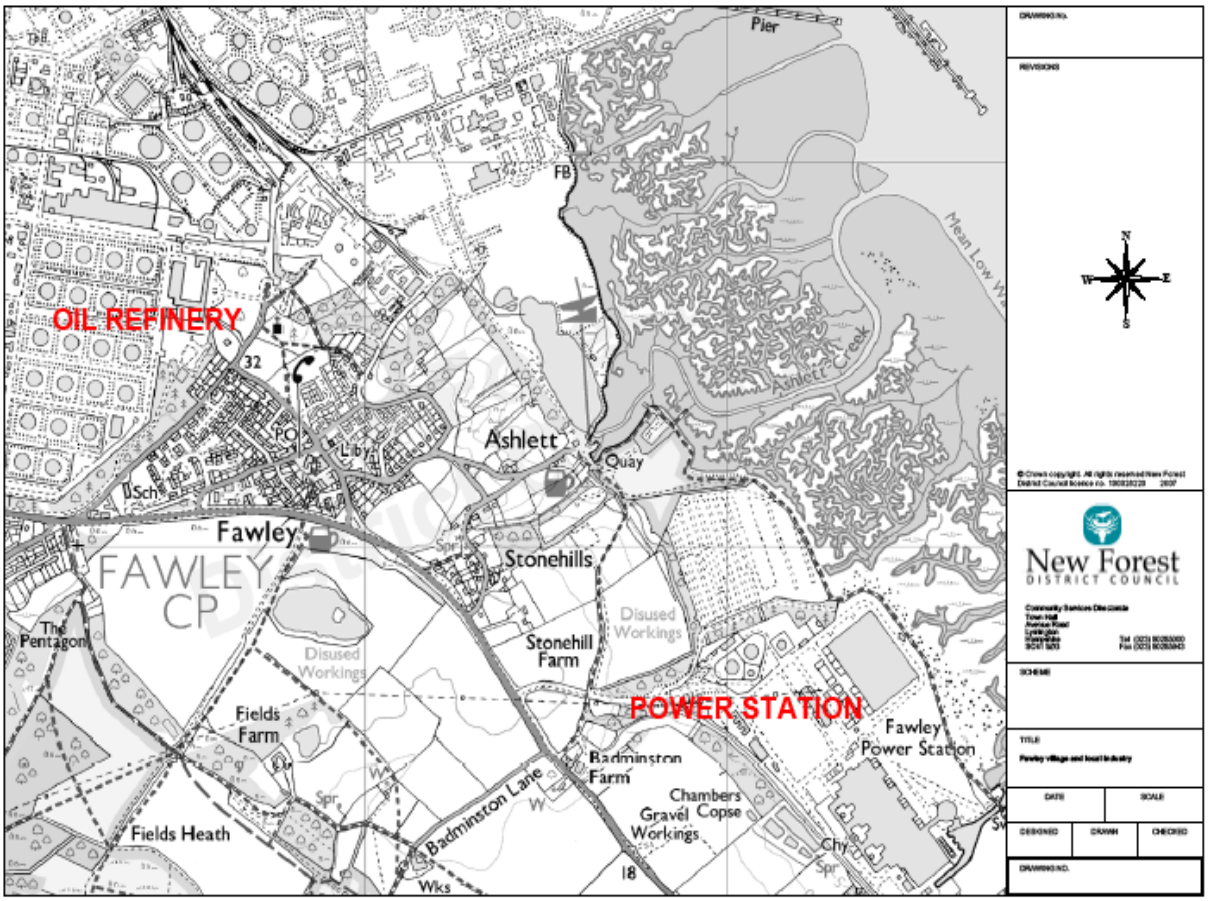
Power station located 1.6km south east of the centre of Fawley village.

A map of the village in relation to some of these processes is shown on page 14.

Map Showing Waterside Area



Map Showing Fawley Village and Local Industry



2.2 Review and Assessment Process for Fawley

The Review and Assessment process, as described in Chapter 1, was undertaken for Fawley, with the following outcomes;

Updating and Screening Assessment

The air quality in Fawley was assessed in the Updating and Screening Assessment 2003, from which it was concluded that there was a likelihood of an exceedance of the 15 minute mean objective for sulphur dioxide (SO_2) in Fawley due to monitoring results obtained in 2001 and 2002.

However, due to the conclusions of a likely exceedance of the 15 minute mean sulphur dioxide objective the Authority had a duty under the Environment Act 1995 to undertake a Detailed Assessment.

Detailed Assessment

As discussed further in Chapter 3, sulphur dioxide is monitored in Fawley using a real time continuous analyser. Therefore monitored sulphur dioxide concentrations are obtained from the site of the analyser rather than at numerous locations in and around Fawley village.

However, in order to obtain further information on the likely concentrations of sulphur dioxide in the vicinity of Fawley village, modelling work was undertaken. The Authority employed consultants, Faber Maunsell[1], to undertake modelling studies to assess the likely impact of sulphur dioxide at relevant locations in Fawley and to determine whether the 15 minute mean objective was likely to be met by 2005. The results from the modelling provided the basis for the production of the Detailed Assessment 2004.

The conclusions from this report were that the real time continuous analyser is ideally located in Fawley village hall where sulphur dioxide concentrations are likely to be at their highest, however the whole of Fawley village is likely to be affected by emissions of sulphur dioxide from the Esso Petroleum oil refinery. It was also concluded that in Fawley village there are some contributions to ambient sulphur dioxide from shipping in Southampton Water although the significant contribution is from industrial sources. In addition, the modelling predicted no exceedance of the sulphur dioxide 15 minute mean objective in 2005, therefore there was no requirement to declare an Air Quality Management Area (AQMA).

The Authority continued to monitor sulphur dioxide concentrations in Fawley village using a real time continuous analyser located in the village hall.

Progress Report

In accordance with the Review and Assessment Process, the Authority produced a Progress Report in 2005. This report details the monitoring results for the previous year, i.e. for 2004.

The monitoring results in 2004 did not show an exceedance of the 15 minute mean objective for sulphur dioxide in Fawley village. However, the results from the real time continuous analyser in Fawley village showed 46 exceedances of the sulphur dioxide 15 minute mean for the period January 2005 – April 2005, thereby exceeding the permitted 35 a year.

Whilst the Progress Report 2005 should only have reported on results from 2004, the number of exceedances already monitored in early 2005 could not be ignored and it was therefore evident that by the 31st of December 2005 the 15 minute mean would be exceeded by more than the permitted 35. Therefore, following advice from DEFRA, the Authority concluded that it would be declaring an Air Quality Management Area in Fawley with regards to the objective relating to the sulphur dioxide 15 minute mean with the focus on industrial sources.

Air Quality Management Area

Following the conclusions reached in the Progress Report 2005 the Authority consulted with the local community, Environment Agency, local industry and Council Members, and formally declared an Air Quality Management Area in December 2005. The extent of the Area Quality Management Area is indicated by the shaded area shown on the map on page 18.

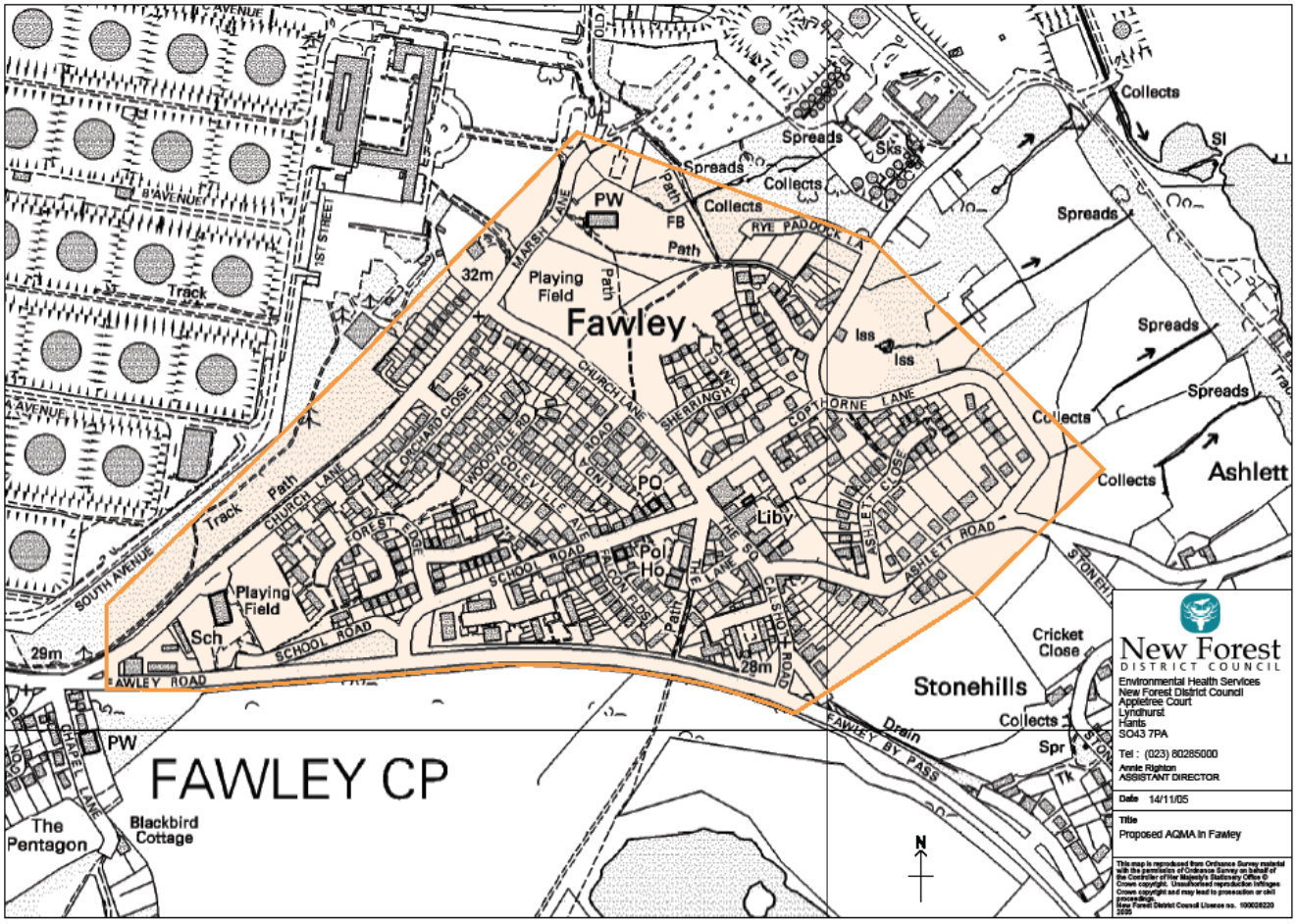
As a result of the monitoring and modelling work, it was concluded that whilst exceedances of the 15 minute mean objective for sulphur dioxide may not affect the whole of Fawley village, it was prudent to include the majority of Fawley village within the declared Air Quality Management Area.

Further Assessment

The Further Assessment 2006 was produced 12 months after the declaration of the Air Quality Management Area and was based on the monitoring data obtained in 2005 and gave partially ratified results for 2006. The purpose of this report was to validate the Air Quality Management Area, determine the reduction in sulphur dioxide required to meet the sulphur dioxide 15 minute mean objective and proportion the source(s) of sulphur dioxide in Fawley.

It was concluded that the declaration of the Air Quality Management Area was justified and there was no requirement to revoke or amend the declared area. The required reduction in sulphur dioxide and sources of pollution are discussed further in Chapter 3.

Map Showing Air Quality Management Area in Fawley



3.0 SULPHUR DIOXIDE IN FAWLEY

3.1 Health Impacts Of Sulphur Dioxide

Sulphur dioxide is a gas which can be formed naturally by volcanic activity. However in the UK the main source of sulphur dioxide is from the combustion of sulphur-containing fossil fuels, principally coal and heavy oils[2].

Sulphur dioxide is one of the gases which when combined with particulate matter forms smog, which resulted in public health issues in London during the 1950's. These health issues included increases in respiratory illnesses which in some cases resulted in the premature death of people. Following these incidents the Government passed the Clean Air Act in 1956 with the aim to reduce the use of coal and situating coal and oil burning power stations in rural locations.

The main health impacts associated with sulphur dioxide concern the respiratory system. Sulphur dioxide is an irritant when it is inhaled as it is acidic. High concentrations of the gas may cause breathing difficulties particularly in people who already suffer respiratory problems such as asthma[2].

3.2 Monitoring Of Sulphur Dioxide

Due to the close proximity of residential properties in Fawley village to large industrial processes, New Forest District Council has been monitoring sulphur dioxide in the village since at least 1996. The site used for the monitoring is located in the attic of the village hall. This location is shown in Appendix 1.

Initially monitoring was undertaken using an 8 port valve sulphur dioxide bubbler which was a time consuming and quite crude monitoring method however it was sufficient at the time. In 2001 the Authority installed a real time continuous analyser at the same location.

A further sulphur dioxide analyser and particulate real time continuous analyser were located in Holbury approximately 3km north east of Fawley village and 800m west of the boundary of the Esso Petroleum oil refinery.

In order to ensure the analysers function correctly and within the accepted parameters, New Forest District Council calibrates them fortnightly. This involves zeroing the analyser by either the use of a zero gas or scrubber column and then running a calibration gas of known concentration through the analyser to check it is determining the correct concentration of the gas. In addition the filter on the analyser, which removes particles from the air sample, is changed.

New Forest District Council also employs the services of the environmental research group (erg) at Kings College, London to validate and ratify the data from the Authority's real time analysers. Erg downloads the data daily, undertakes a basic check to validate the data from which any issues or exceedances can be raised. The data is then partially ratified every 3 months and fully ratified at the end of each calendar year. In addition the real time continuous analysers are also externally audited by the National Physical Laboratory (NPL) annually and the intention is to extend this to biannual audits.

The sulphur dioxide analysers allow the Authority to monitor sulphur dioxide concentrations against the three objectives set for this pollutant which are shown in Table 2.

Table 2

Table Showing the Sulphur Dioxide Objectives

Period	Objective
24 Hour Mean	125 μg/m^3 or less, not to be exceeded more than 3 times per year, to be achieved by 31st December 2004.
Hourly Mean	350 μg/m^3 or less, not to be exceeded more than 24 times a year, to be achieved by 31st December 2004.
15 Minute Mean	266 μg/m^3 or less, not to be exceeded more than 35 times a year, to be achieved by 31st December 2005.

Table 3 shows the sulphur dioxide results for the past 4 years at Fawley and states if the sulphur dioxide objective was met.

Table 3

Table Showing Results for Real Time Continuous Analyser Site

Objective	Number of Exceedances			
	2003	2004	2005	2006
24hour mean	0	0	0	0
Would the 2005 objective for the SO_2 15 min mean be met?	**Yes**	**Yes**	**Yes**	**Yes**
Hourly mean	0	0	4	0
Would the 2005 objective for the SO_2 15 min mean be met?	**Yes**	**Yes**	**Yes**	**Yes**
15 min mean	18	7	63	10
Would the 2005 objective for the SO_2 15 min mean be met?	**Yes**	**Yes**	**No**	**Yes**

It can be seen that 2005 was an exceptional year with regards to the results in that exceedances were monitored of the hourly mean (although well within the 24 permitted exceedances in one year) and the 15 minute mean objective was exceeded. It was in 2005 that the more unusual weather conditions of strong north westerly winds were observed.

Following the results in 2005 and through working with the Environment Agency and Esso Petroleum oil refinery it was concluded that the majority of the monitored exceedances of the 15 minute mean occurred during specific weather conditions. These weather conditions are strong (greater than 9.77 m/s which equates to 19 knots) north westerly (between 300 – 315 degree) winds. Such weather conditions have been confirmed using weather monitoring equipment at a New Forest District Council monitoring site (at Holbury) and at the Esso Petroleum oil refinery.

In such conditions, the emissions from 4 outlets [SP4 (steam plant 4), SU3/4 (sulphur units 3/4), FCCU (fluidised catalytic cracking unit) and pipestill 3] on the Esso Petroleum oil refinery site combine. Under the described weather conditions, the plume of emissions from the outlets ground in Fawley village and at times may result in the exceedance of the sulphur dioxide 15 minute mean which is 266 μgm^{-3}.

Esso Petroleum also confirmed that during 2005 the crude slate and fuel composition altered resulting in an increase in the sulphur content of the fuel and therefore the emissions of sulphur dioxide. Since 2005 the sulphur content in the fuel used at the refinery has decreased, but the emissions of sulphur dioxide from the site have increased. However, it should be noted that the emissions are within the permitted emission limits authorised for Esso Petroleum under the permit issued by the Environment Agency.

Therefore it would be fair to conclude that the weather conditions, sulphur content of the fuel and emissions all impact upon the 15 minute mean objective for sulphur dioxide.

The results also show that it is the 15 minute mean which is exceeded most frequently, however this is not surprising due to the small averaging timescale of this limit. Therefore it is this objective which has formed the basis of the Action Plan detailing options which are aimed at preventing it from being exceeded.

3.3 Required Reduction Of Sulphur Dioxide

The Further Assessment for Fawley determined the improvement required of sulphur dioxide within the Air Quality Management Area to achieve the 15 minute mean objective.

Based on the 2005 results, there were 63 monitored exceedances of the 15 minute mean which equates to 28 over the permitted 35 exceedances allowed under the 15 minute mean objective. Therefore the required improvement, based on 2005 data, was determined as 45% in order to meet the 15 minute mean objective for sulphur dioxide.

It should be noted that the results from 2006 did not show an exceedance of the 15 minute mean objective for sulphur dioxide, with only 10 monitored exceedances, which is well within the objective. However it was concluded that the weather conditions in 2005, with the high proportion of strong north westerly winds, resulted in the high number of monitored exceedances.

Whilst such weather is not considered normal in the area, obviously such weather conditions could recur. Therefore the Air Quality Management Area had to be declared and the Action Plan needs to address options which should reduce the number of exceedances of the 15 minute mean for sulphur dioxide should similar weather conditions to those in 2005 recur.

3.4 Source Apportionment

During the production of the Further Assessment for Fawley the sources of sulphur dioxide were determined. Whilst sulphur dioxide is produced naturally from for example volcanoes, the main sources are from industrial processes such as oil refineries and power stations, both of which are in the vicinity of Fawley village and are likely to be the main contributor to local sources of sulphur dioxide.

There are however other sources of sulphur dioxide in the vicinity of Fawley and these are noted in Table 4. This data has been obtained from estimates from the National Atmospheric Emissions Inventory website[3] and provides an indication of the average emissions of sulphur dioxide in the Fawley area.

Table 4

Table Showing Average Emissions of Sulphur Dioxide in Fawley in 2003.

Source	Emissions tonnes / yr / km^2	Emissions %
Commercial, residential and agriculture	0.10	71.43
Other transport, including shipping	0.025	17.86
Road transport	0.01	7.14
Waste treatment	0.00029	0.21

The data in Table 4 does not take into account the large industrial processes in the vicinity of Fawley and only lists area sources which form the background concentrations. However the industrial processes cannot be ignored. Using data obtained from the Environment Agency's Pollution Inventory[4] Table 5 shows the sulphur dioxide emissions from local industrial processes.

Table 5

Table Showing Industrial Point Sources of Sulphur Dioxide within 5km of Fawley 2003 – 2005.

Operator	Emissions tonnes / yr			Emission limit tonnes / yr (under IPC authorisation*)
	2003	2004	2005	
Esso Petroleum	14,227	20,374	20,721	36,000
RWE npower	498	302	674	11,700 (site A limit)
ExxonMobil Chemical	<300	<300	< 300	379 (mass limit)
npower Cogen (Esso)	<100	<100	<100	No Limit

**** Emission limits now reduced under PPC permit as explained further in Chapter 5.***

It was concluded in the Further Assessment 2006 that the Esso Petroleum oil refinery emitted the majority of sulphur dioxide from industrial sources close to Fawley village. Although it would be worth noting the potential contribution from the RWE npower power station given their permitted emission limit from the site. However the actual emissions from this process are much less than the permitted emission value which is consistent with data which shows that the RWE npower power station only operates on average 1-5% annually.

The ExxonMobil Chemical and npower Cogen processes contributed an amount of sulphur dioxide which was below the reporting thresholds required by the Environment Agency under their IPC Authorisation (to be replaced by the PPC Permit). Therefore whilst it is noted that these processes contribute to the ambient sulphur dioxide concentrations, they are not considered significant contributors when compared with the Esso Petroleum oil refinery.

4.0 POLICY CONTEXT AND EXISTING STRATEGIES AND CONSULTATIONS

There are currently a number of policies and strategies undertaken by the Environment Agency, Hampshire County Council and New Forest District Council which have some regard or reference to air quality. These are outlined below;

4.1 Permitted Processes

Industrial processes are either regulated by Local Authorities or the Environment Agency depending on the process type, size and / or polluting potential. Broadly speaking the Environment Agency regulates the larger, more polluting processes which includes over 2,000 processes in England and Wales. With regards to the exceedance of the 15 minute mean objective for sulphur dioxide, it is the processes regulated by the Environment Agency which are of concern.

The Integrated Pollution Prevention and Control (IPPC)[5] regime is a European Directive which applies an environmental approach to the regulation of certain industrial activities. This Directive is being implemented in England and Wales by the Environment Agency for the processes they regulate through the Pollution Prevention and Control (PPC) (England and Wales) Regulations 2000 and supersedes process Authorisations issued under the Integrated Pollution Control (IPC) system, with a permit.

In summary, industrial processes which come under PPC regulations have their emissions (to air, water and land) and environmental effects considered as a whole. As regulator, the Environment Agency sets permit conditions for a variety of emissions the aim being to achieve a high level of environmental protection.

The permit conditions are based on the 'best available techniques' or BAT which aim to balance the environmental benefits with the cost to the process. In essence IPPC aims to prevent emissions or reduce the emissions to acceptable levels if prevention is not a practical solution.

There are 12 permitted processes along the Waterside which include the Esso Petroleum oil refinery and the RWE npower power station. In the case of the Esso Petroleum oil refinery their permit was due to be determined in October 2007, however delays resulted it not being issued until December 2007.

New Forest District Council is aware that Defra guidance[6] recommends the production of Air Quality Action Plans within 12 – 18 months of the declaration of the Air Quality Management Area. The Air Quality Management Area was declared in December 2005 therefore production of the Action Plan for Fawley in January 2008 is not ideal.

However it was concluded by New Forest District Council that the issuing of a new permit for the Esso Petroleum refinery should be undertaken first so that permit conditions addressing sulphur dioxide emissions from the refinery could be incorporated within the Air Quality Action Plan. As a statutory consultee for the permit application, New Forest District Council was aware of certain matters which may have been included in the permit, however until it was issued the Authority was unaware of the detail of the permit which may have been relevant to the Air Quality Action Plan.

Therefore, it was unfortunate that the issuing of the permit was delayed by a number of weeks which in turn delayed the production of the Air Quality Action Plan for Fawley. New Forest District Council formally wrote to Defra to inform the Department of the reason for the delay and advised that the Air Quality Action Plan would be out for consultation 3 weeks following the issuing of the permit.

The new permit for Esso Petroleum (permit number BR6996IC)[7] was issued by the Environment Agency on 24th December 2007. The permit contains conditions addressing all manner of issues including air pollution, noise, waste and accident prevention under which the process has to operate. Whilst many of these conditions were incorporated within the previous process authorisation, a number of additional conditions are included within the permit.

The introductory note of the permit (which does not form part of the actual permit) refers to the environmental impacts of sulphur dioxide emissions from the refinery and the declaration of the Air Quality Management Area. The relevant processes noted are the incomplete recovery of sulphur from the sulphur recovery plant, the burning off of coke (containing sulphur) from the fluidised catalytic cracker catalyst and the combustion of fuel oil in the boiler plant.

The conditions stated in the permit with regards to the sulphur dioxide emissions from the site are set out below. A copy of the permit is available for viewing at New Forest District Council Offices, Environmental Protection Department, Appletree Court, Lyndhurst, Hampshire SO43 7PA.

Improvement Programme

A number of permit conditions are listed under the improvement programme heading and include permit condition 2.5.1 which states that the operator will complete the improvement programme by the specified date.

The improvement programme will put in place a number of work schemes which will lead to improvements of the process, some of which should result in a reduction of sulphur dioxide emissions from the refinery.

The improvement programme is shown in Table S1.3 of the permit (reproduced in Appendix 2), and the programmes which specifically relate to the reduction of sulphur dioxide emissions are outlined in the options discussed in Chapter 5.

Emissions and Monitoring

There are a number of permit conditions concerning emissions to air from the refinery together with the associated monitoring. The emissions of concern include sulphur dioxide.

Conditions 3.1.2, 3.1.3 and 3.1.4 state that the set emission limits shall not be exceeded and those of relevance to sulphur dioxide are further discussed in Chapter 5. In addition, condition 3.1.5 states that the 15 minute mean objective for sulphur dioxide shall not be exceeded at any of the off-site monitors specified, namely the analysers owned and operated by New Forest District Council at Fawley and Holbury.

Information

Condition 4.3.1 states that the Environment Agency (as the process regulator) shall be notified without delay of any recorded exceedance of any sulphur dioxide limit including the 15 minute mean objective. Therefore the regulator should be kept informed of any issues concerning sulphur dioxide emissions from the process.

If the Environment Agency determines that any of the permit conditions for any permitted process have been breached, enforcement action may be taken against the operator. This situation is discussed further in Chapter 5, option 7 (Enforcement of industrial permitted conditions).

With regards to the RWE npower power station, their permit[8] was determined in May 2007 however the permit does not make specific reference to the declared Air Quality Management Area in Fawley.

4.2 Local Plan

The New Forest District Local Plan (first alteration)[9] is a document produced by New Forest District Council. The Local Plan provides detailed planning policies to guide and control the use of land, against which applications for planning permission will be determined. The Local Plan, which was adopted in 2005, must conform generally to the adopted Hampshire County Structure Plan 1996 – 2011.

Objective 11 states that the Local Plan will;

- protect air and water quality and reduce the burden of pollution of air, land and water by controlling potentially polluting development (with reference to PPS23)[10] .

4.3 Future Matters

Future Matters is a recently released consultation document, which has been jointly produced by the New Forest Local Strategic Partnership, New Forest District Council and the New Forest National Park Authority.

Future Matters involves three plans which overlap in some capacity;

- New Forest District Community Strategy
- New Forest National Park Management Plan
- Local Framework Development (which will replace the New Forest Local Plan)

These plans will set out policies for the future and what each organisation will achieve. The Future Matters consultation is the opportunity for the public and organisations to help determine their environment and quality of life in the New Forest now and in the future.

Within the consultation document there is reference to the duty placed on a Local Authority to review and assess air quality within its District and the work that has, to date, been undertaken.

4.4 Green Audit

A Green Audit is currently being undertaken by New Forest District Council. The audit is concerned with the way the Authority and communities within New Forest District function with the aim to operate as environmentally as possible by, for example, reducing waste and energy use.

There are nine target areas within the Green Audit, for example, assessing the way the Authority's buildings are run and planning for climate change. However, some target areas are of common interest with air quality work, for example, the way in which communities are developed and run, and the way New Forest District Council work with businesses, both of which would impact on air quality issues.

The Green Audit must ensure that any resulting policies do not have a negative impact on air quality. Therefore there will be close working between the officer implementing the Green Audit and Environmental Protection whose responsibility it is to review and assess the air quality in the district.

5.0 PROPOSED OPTIONS

The options being proposed in this section are either currently being progressed, possibly as part of industrial permit conditions or are being forwarded for consideration as schemes which may decrease short term sulphur dioxide concentrations within the Air Quality Management Area in Fawley. It is acknowledged that industrial processes emit the majority of localised sulphur dioxide, therefore many of the Options target such processes however other Options which are non-industrial based are also considered. The industrial processes considered under some of the Options are the Esso Petroleum oil refinery and the RWE npower power station.

It should be noted that decreasing sulphur dioxide concentrations may be achieved through a combination of proposed Options which may result in the desired outcome.

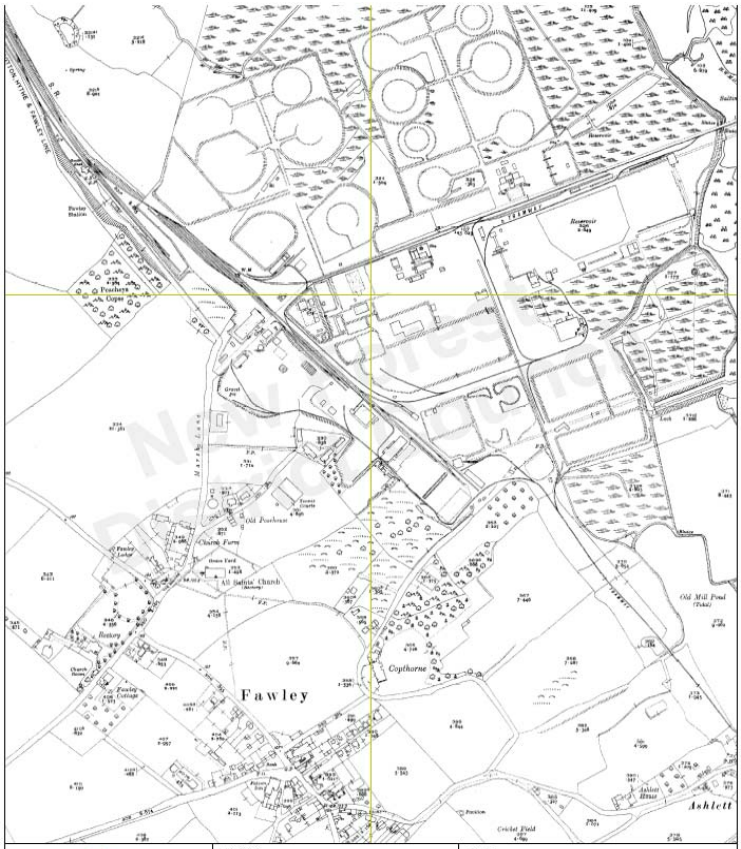
The Options outlined below are not listed in order of priority.

5.1 Option 1
Relocation of industrial process

Refinery

As previously stated there has been an oil refining process on the current Esso Petroleum site since the 1920's. This is shown on historical maps held by the Authority when an industrial process is clearly evident north of Fawley village as shown on the map below.

Historical map (1924 – 1947) showing refinery and Fawley village



The industrial process rapidly expanded during the 1950's when the site was developed by Esso Petroleum. This expansion is clearly evident on the 1956 – 1960 historical map when the refining capacity was 5.5 million tonnes per year. By the 1970's the oil refinery site is shown as it is basically seen today.

The current refinery site covers 5 square miles and is the largest oil refinery in the UK. The refinery supplies 15% of the UK's oil products, including fuels, petrochemical feedstocks, lubrication oils and bitumen. The refining capacity from the site is now 16 million tonnes per year. Approximately 80% of the refinery output leaves the site by pipeline, 15% leaves by sea and the remaining 5% is by road or rail. The refinery has 9 sea berths which handle 2,000 shipping movements per year[11].

Therefore, it is evident that the refinery is a vitally important industrial site which produces a vast volume of product. As a result it is highly unlikely that such a large and established industrial process would be relocated, in particular just the costs involved to relocate would make such a task extremely difficult.

Power Station

The power station at Fawley was built in the 1960's. The power station has a capability of producing 2000MW of power via four 500MW oil fired units operating on heavy fuel oil obtained from a pipeline from the refinery. In addition there are four 17.5 MW gas turbines on site.

During the 1990's only one unit was operational, plus two gas turbines. However during 2006 a further unit and gas turbine were made commercially available[12].

RWE npower has informed the Authority that as an 'opted out' power station, by declaring against the Directive 2001/80/EC on the limitation of emissions of certain air pollutants into the air from large combustion plant, the power station has undertaken not to operate the plant for more than 20,000 hours between 01/01/08 – 31/12/15. After which the plant is scheduled to close. Currently these hours have been further reduced to 10,000 although there is the possibility for the process to increase the hours back to 20,000 if necessary.

However the process operates for considerably less than these hours, with an average of 302 hours per year over the past 3 years and 126 in 2007. Typically RWE npower operates for between 1-5% of time over a year.
As previously stated the RWE npower power station site is currently scheduled to close in 2015, therefore it is unlikely that the plant would be relocated in the immediate future. Closure of the power station would decrease sulphur dioxide emissions in Fawley. However it is always possible, depending on the state of the British Power industry and electricity demand that the Government may decide to keep this process operating.

It should be noted that it is not known what will become of the site if the process does close.

Option Summary

(i) it is unlikely that the oil refinery will close or relocate in the near future.

(ii) the current schedule for the power station is that it will cease operation in 2015 which will result in reduced sulphur dioxide emissions in the local area.

5.2 Option 2
Changes to industrial process technology

Refinery

As stated in Option 1, since the 1920's an oil refinery has been operating on the current Esso Petroleum oil refinery site. When Esso Petroleum purchased the process in the 1970's the site was developed as a large operating process which is what is basically seen today.

It is fair to state that if a new oil refinery were to be built on the current site, then a different plant lay-out and new technology would possibly be utilised. However, the current Esso Petroleum refinery is unlikely to be completely rebuilt.

This is not to say that new technology is never installed at the Esso Petroleum refinery. An industrial standard or permit condition may require the installation of new technology however this is often on sections of the plant and unlikely to be concerning the whole process, for example, in accordance with the issuing of the new permit the refinery will be installing DeSOx additive to remove more oxides of sulphur from the emissions from the fluidised catalytic cracking unit (further detail contained in Option 3).

Therefore the use of such new technology could result in the reduction of sulphur dioxide emissions from the process and it should be noted that there is a general requirement under the permit (and the previous Authorisation) for the refinery to comply with Best Available Techniques (BAT).

Power Station

The RWE npower power station has remained basically unchanged since the process was constructed in the 1960's. Similar to the refinery, whilst the process technology has progressed within the industry there has not been the need or requirement from the regulator to upgrade the process technology throughout the whole process.

If the power station were to be re-built then different industrial technology would be used. However it is unlikely the current process will be completely replaced with new industrial technology, particularly in light of the current position that the process is due to close 2015.

Option Summary

(i) it is unlikely that the refinery will replace the current process completely with new technology. It is acknowledged that new technology may be used on the site when parts of the process are upgraded or replaced in the future which may result in a decrease in emissions including sulphur dioxide (see Option 3).

(ii) it is unlikely that the power station will be replacing part or all of its process with new technology due in the main to the prospect that the process will cease to operate in 2015.

5.3 Option 3
Installation of industrial emission abatement equipment

Refinery

The current refinery process has numerous types of abatement equipment installed to reduce emissions which include sulphur dioxide. Such equipment has been installed as part of the original Integrated Pollution Control (IPC) authorisation issued in 1993 by the then Her Majesty's Inspectorate of Pollution (HMIP) which was replaced by the Environment Agency (EA) in 1996. Following the issue of the initial authorisation, subsequent variations to the process have also been made.

As previously stated in 4.1 (page 23) Esso Petroleum Ltd. has recently been issued a new PPC operators permit (BR6996IC)[7] from the Environment Agency, which fully supersedes the previous Authorisation (AF8009). The Environment Agency and Esso Petroleum are aware of the issue concerning sulphur dioxide concentrations and the declared Air Quality Management Area in Fawley. As a result the new process permit takes into account sulphur dioxide emissions and the 15 minute mean objective.

The permit[7] for the refinery includes a number of Improvement Programme Requirements (as shown in Appendix 2) some of which involve the installation of abatement equipment. Examples of those requirements specifically relating to sulphur dioxide are given below.

Requirement IC 29

This refers to the production of a written plan detailing measures to achieve a sulphur recovery efficiency of not less than 99%. This may be achieved by the installation of an additional catalytic reaction system on the sulphur plant to combust hydrogen sulphide in an oxygen deficient atmosphere to produce sulphur and water vapour.

Currently the refinery operates at a sulphur recovery efficiency of 97%. Following discussions with the Environment Agency the extra 2% in sulphur recovery efficiency should result in an extra 2,792 tonnes of sulphur per year being abated based on a normal year's operation.

This written plan has to be completed by 30/09/10, and subject to the works required to achieve the stated sulphur dioxide recovery efficiency, it is likely to be a medium to long term project.

Requirement IC 5

This states the work to be undertaken on the existing fluidised catalytic cracking unit (as noted in Option 2) to reduce sulphur dioxide emissions equivalent to not less than 70.5% based on unabated emission levels. In order to achieve the required reduction, the operator has suggested that it may fit DeSOx equipment.

Following discussions with the Environment Agency, the Authority has been informed that installation of DeSOx equipment should result in an additional 2,800 tonnes of sulphur per year being abated based on a normal year's operation. The DeSOx equipment is due to be trialled in 2008 with installation proposed for 2009, therefore this procedure is viewed as a short to medium term project.

Both of these improvement requirements, if fully undertaken will result in a reduction of sulphur dioxide emissions to air from the refinery.

Power Station

The PPC permit for the RWE npower power station was issued in May 2007[8]. The permit confirms that the operator (RWE npower) has 'opted out' the main boiler units from the large combustion plant directive.

The outcome of this 'opt out' as previously stated is that the RWE npower power station can only operate for 20,000 hours between 2008 and 2015, which is currently reduced to 10,000 hours under the large combustion plant directive.

If the process were required to operate for more than the 10,000 hours, the continuous emission monitoring equipment on site would be put into use. It is unlikely that any further emission abatement equipment will be installed in the future at this process.

Option Summary

(i) the permit for the Esso Petroleum refinery includes measures to install additional emissions abatement equipment to reduce sulphur emissions.

(ii) the permit for the RWE npower power station does not include measures for the installation of additional emission abatement equipment at the process.

5.4 Option 4
Changes in industry operating pattern

Refinery

The previous IPC Authorisation for the Esso Petroleum refinery included a variation/procedure to change the industrial operating pattern during potential incidents when the 15 minute sulphur dioxide mean was likely to be exceeded. The procedure was produced by Esso Petroleum in August 2006 with the assistance of New Forest District Council and the Environment Agency following discussions aimed at reducing the likely exceedance of the 15 minute mean objective.

This procedure is shown in Appendix 3, however in summary an alarm has been installed on the real time continuous sulphur dioxide analyser located at Jubilee Hall in Fawley village. If sulphur dioxide concentrations rise above 20 ppb, the refinery control room is informed by the alarm via a radio link. From this moment the refinery then receives the real time data from the analyser so the refinery can track the progress of sulphur dioxide concentrations in the village.

In addition the refinery also monitors weather data using data from a MET weather station located at the refinery site. Due to previous analysis it has been found that it is more likely that exceedances of the 15 minute mean are monitored in Fawley village during strong north westerly winds.

If either or both of the above criteria are noted, i.e. the increasing sulphur dioxide concentrations monitored at the analyser and / or the ideal weather conditions for an exceedance of the 15 minute mean, then the refinery should follow the procedure. Namely either switching SP4 to burn a lower sulphur fuel oil, if available, reducing fuel oil burning to a minimum or until modelled impact of emissions is within air quality limits.

The permit for the refinery process does include this procedure and is reinforced through an improvement condition (IC16) and condition 2.3.1, which states that *'the activities shall . . . be operated using the techniques and in the manner described . . . ,'* will ensure this procedure is adhered to.

The alarm procedure should act as an additional level of control that will enable the refinery to respond to increasing concentrations of sulphur dioxide in Fawley village to hopefully avoid an exceedance of the 15 minute mean objective.

Power Station

The RWE npower power station operates as a 'peak loading' power station. As a result the RWE npower power station usually operates during weather extremes, for example during very cold periods when there is demand on domestic heating or during very hot weather when there is a demand on air conditioning and refrigeration units.

Therefore the power station operates as required by the power supplier either during these peak loading occasions or to cover for other power stations which may not be operational at the time.

So, it could be argued that if the process is only operating when there is a demand for the product then the process is already operating at a minimum requirement and further operating restrictions would then be damaging to the productivity of the RWE npower power station.

Option Summary

(i) there is a current procedure which links the refinery to the Authority's real time analyser and puts into place measures to reduce sulphur dioxide emissions. New Forest District Council supports the inclusion of this procedure in the operators permit.

(ii) it is unlikely that the current operating pattern at the power station will alter. It currently only operates as required, therefore producing the minimal amount of emissions from the process.

5.5 Option 5
Changes in industrial fuel

Refinery

A number of Improvement Programme Requirements (as shown in Appendix 2) within the refinery permit [7] refer to potential changes in industrial fuel. Examples of those requirements specifically relating to sulphur dioxide are given below.

Requirement IC 17

This requirement states that Esso Petroleum refinery will have to undertake an Energy Balance Study. The refinery will report to the Environment Agency with regards to identifying opportunities with a plan to implement the most beneficial options if they are shown to be feasible and economic.

Within the Improvement Programme Requirement noted above, the written report will include details on the conversion from refinery fuel oil used in one of the boiler units (SP4) to the burning of refinery gas. Following discussions with the Environment Agency it is estimated that reductions in burning oil and the increased use of gas will reduce emissions of sulphur from the process by 6,800 tonnes per year based on normal operations due to the reduced sulphur content in gas compared with refinery fuel oil.

The energy balance study will be written by 31/12/08 and it is understood the conversion from refinery oil to gas will occur in stages until full conversion in 2012.

The use of gas at SP4 will also result in reductions in oxides of nitrogen (NOx), carbon dioxide and particulate matter. In addition to the overall improvement in air quality emissions from the SP4 stack the visual impact of the plume will improve as the emissions are reduced resulting in a ‘cleaner’ plume.

Therefore an energy balance study for the whole of the refinery and the conversion to gas in SP4 must be viewed as a positive step forward. These measures would reduce emissions of sulphur dioxide to the atmosphere.

Requirement IC 23

This is a requirement to produce a detailed written plan for the replacement of high sulphur content fuels with lower sulphur fuels. This plan should be completed by 30/09/09 and is cross referenced with Option 6.

Power Station

Following information obtained from the power station it is evident that the RWE npower power station has no immediate plans to change their current fuel from oil. It is likely that the current decision to close the process in 2015 will not lead to immediate changes to the industrial fuel currently utilised.

It has been noted that RWE npower has informed the Local Authority that the Fawley power station's sister oil fired power station in Littlebrook has been recently trialling biomass fuels such as palm oil. Biomass fuels have a reduced sulphur content, thereby reducing the sulphur dioxide emissions from the process. Therefore as a company, RWE npower is investigating the development and use of alternative fuels, which in the future may be used to operate power stations including Fawley if it remains operational.

Option Summary

(i) New Forest District Council supports the permit requirement for Esso Petroleum to undertake an energy balance study for the whole refinery. It may result in a reduction in the use of refinery fuel oil in favour of the use of gas which would reduce sulphur dioxide emissions from the process.

(ii) it is unlikely that the RWE npower power station will be changing its fuel source from oil. It is acknowledged that as a company RWE npower is investigating the use of biomass as an alternative fuel source to oil.

5.6 Option 6
Reduction in emissions from industry

Refinery

Within the Permit for the Esso Petroleum refinery there are fixed emission limits for air pollutants including sulphur dioxide. These emission limits are agreed with the Environment Agency as the process regulator.

In 2007 the emission limit for sulphur dioxide was 36,000 tonnes per year. It should be noted however that Esso Petroleum reported an emission figure for sulphur dioxide in 2006 of 18,400 tonnes, which is well below the emission limit. Under the permit, the emission limit for sulphur dioxide from the process has been reduced to 20,800 tonnes per year. This limit is then reduced further to 18,000 tonnes between 2009 – 2012, then to 11,200 tonnes between 2013 – 2015, and a final reduction to 8,600 tonnes per year after 2016.

In addition to the mass limit for sulphur dioxide, the permit has set a 'bubble' limit for this pollutant for the refinery. The concept of a bubble limit is a dome shaped boundary over the plant area, in which the bubble limit for the pollutant, in this case sulphur dioxide, cannot be exceeded. The bubble limit has been set for an hourly time period of 2,700 mgm^{-3}. These various emission limits have come into immediate effect with the issuing of the permit.

Sulphur dioxide emissions have been monitored from numerous point sources on the site throughout the life of the previous Authorisation. Under the permit there will be 23 point sources which will be monitored for sulphur dioxide emissions which include the main sulphur emitting processes. The monitoring results are reported quarterly to the Environment Agency.

In addition to the process limits for sulphur dioxide emissions there are further Improvement Programme Requirements stated in the permit [7] (as shown in Appendix 2) which may reduce emissions to air. Examples of those requirements specifically relating to sulphur dioxide are given below.

Requirement IC 8

This states that the refinery will provide a written plan detailing the measures to be taken to ensure the refinery can demonstrate compliance with the new bubble limit for sulphur dioxide. This plan has to be submitted by 31/03/08.

Requirement IC 16

This improvement condition concerns an update of the present Esso Petroleum Air Quality Management Plan. This plan sets minimum requirements including ambient monitoring equipment, methods for predicting exceedances of sulphur dioxide objectives and details of an annual review of the Air Quality Management Plan. This plan has to be submitted by 30/09/08.

Requirement IC 23

This requirement states that the refinery will produce a written plan detailing the measures to be taken to reduce the mass of sulphur dioxide released from combustion plants at the refinery by 31/12/10. The plan will include details of how higher sulphur content fuels will be replaced by lower sulphur fuels. The plan is to be submitted by 30/09/09.

Therefore through the permit, the combination of the process permit conditions relating to the overall process mass limit which will be reduced over time, additional hourly refinery bubble limit and individual stack limits for sulphur dioxide, in conjunction with the Environment Agency approved Air Quality Management Plan, should result in a reduction in the number of exceedances of the 15 minute mean for sulphur dioxide objective in Fawley. In addition, the permit will also ensure sulphur dioxide concentrations from the refinery are monitored and the resulting impacts on the local community assessed.

Power Station

The RWE npower power station operates under the PPC Permit which sets air pollutant emission limits for the process. The emission limit for sulphur dioxide at this process is 11,700 tonnes per year. The permit[7] does state however that this current emission limit will be reduced to 9,000 tonnes per year from the 1st January 2008.

It is noted however that whilst it is encouraging that the emission limits from the power station will be reduced, due to the current operating hours of the process (on average 302 hours per year) the emissions of sulphur dioxide from the process have always been well below the emission limit set in the previous Authorisation or current permit as shown in Table 5 on page 22.

This said, potentially the power station could operate more frequently, obviously within the processes operating emission limits of currently 9,000 tonnes per year of sulphur dioxide and operating hours of 10,000 hours between 2008 – 2015.

Therefore currently the emission limits set in the permit are unlikely to be met due to process limitations.

Option Summary

(i) the permit for the Esso Petroleum refinery includes a reduced mass limit which will decrease until 2016, a process bubble limit and individual stack limits for sulphur dioxide emissions all of which are likely to reduce the amount of sulphur dioxide emitted from the process as a whole. It is acknowledged that the process currently operates within its current emission limits.

New Forest District Council supports the requirement for the refinery to model ground level sulphur dioxide concentrations, and possibly install additional real time continuous analysers off-site and update their Air Quality Management Plan.

(ii) the process permit for the RWE npower power station reduces the limit of sulphur dioxide emissions from the process from 01.01.08. It is acknowledged that the process currently operates well within its set limits however the emission limits are important if the process were to increase its operations.

5.7 Option 7
Enforcement of industrial permitted conditions

As previously stated in order to operate, the large industrial processes along the Waterside have to hold a permit (previously an Authorisation) issued by the Environment Agency. The industrial processes include the Esso Petroleum refinery and RWE npower power station.

As the regulator Environment Agency officers inspect the process and investigate complaints or incidents related thereto. The process operator also has a duty to report any incidents to the Environment Agency and in addition the New Forest District Council or the Parish Council may receive complaints concerning a process from members of the public which are then forwarded onto the Environment Agency for further investigation, if necessary.

The Environment Agency and process operators work within the conditions stated in the permit and it should be noted that permits are produced for each individual process.

If it is found that the process has breached its permitted conditions or there has been an incident, then the Environment Agency will take enforcement action against the process concerned. The level of enforcement action is determined from the Environment Agency's Enforcement and Prosecution Policy.

The enforcement powers available to the Environment Agency include the issuing of enforcement or prohibition notices, variation of the permitted conditions, undertaking remedial work, suspension or revocation of a permit. If a criminal offence has been committed the Environment Agency would consider prosecution in addition to other enforcement action in order to 'punish and deter the offender' [13].

The overall aim of enforcement action by the Environment Agency is to ensure industry takes appropriate action to protect the environment and to ensure compliance with the process regulations [13].

In addition any incidents or breaches of permitted conditions are placed on the public register which is available to view. The public register is operated by the Environment Agency and contains the process authorisation / permit, monitoring results, process variations, incident reports and other documents relating to the process. It is held by the Environment Agency and a copy is available for viewing by the public at New Forest District Council, Environmental Protection Department at Appletree Court, Lyndhurst.

Whilst the process of enforcement is currently operating, and has been for some time, this option will support the future role of the Environment Agency as regulator and we would expect the investigation and necessary enforcement of processes to continue in order to ensure large industrial processes are operating correctly and within their permitted conditions. If processes operate in this manner, the probability of exceedances of air quality objectives, including the 15 minute mean objective are reduced.

Option Summary

(i) to support the continuing role by the Environment Agency as process regulator for large industrial processes along the Waterside, including Esso Petroleum refinery and the RWE npower power station.

5.8 Option 8
Working with the Environment Agency and Industry

As previously discussed the main source of sulphur dioxide in the vicinity of Fawley is from the Esso Petroleum refinery which is permitted to operate and regulated by the Environment Agency. New Forest District Council has a good relationship with both Esso Petroleum and the Environment Agency however this option would ensure a more formal working relationship is set up.

Currently all the Waterside industrial processes (which includes Esso petroleum Ltd. and RWE npower Ltd.), New Forest District Council, local members, the Environment Agency and Natural England meet quarterly via the New Forest Environmental Protection Liaison Committee. During this meeting, one of which is a public meeting, relevant industrial matters are discussed. Whilst this committee enables interested parties to openly discuss issues with the large industries on the Waterside it is felt a smaller group should meet regularly to discuss the sulphur dioxide issues in Fawley village.

It is suggested that the group should consist of Esso Petroleum Ltd., the Environment Agency and Environmental Protection from New Forest District Council. The meetings should focus on sulphur dioxide emissions from the refinery, the monitoring of sulphur dioxide and the operation of the alarm system.

Currently all the above mentioned parties are informed via erg at King's College, London of exceedances of any of the sulphur dioxide objectives. Sulphur dioxide is monitored using the real time continuous analysers located in Fawley and Holbury villages. Any monitored exceedances will often initiate investigations by those concerned as to why an exceedance was monitored. However it would also be appropriate to have a formal meeting to discuss these incidents and for Esso Petroleum to report any times when action may have been taken on their part to reduce the likelihood of an exceedance of a sulphur dioxide objective.

Such meetings should create an openness and better understanding of how the situation regarding sulphur dioxide may be resolved or is managed. In addition the information obtained would be used in the reporting on the progress of the Action Plan for Fawley which is produced annually for Defra. It is suggested that such meetings should be held quarterly.

Option Summary

(i) for New Forest District Council to continue with the New Forest Environmental Protection Liaison Committee which meets quarterly and includes industry and the community.

(ii) for New Forest District Council to organise regular meetings between Esso Petroleum Ltd, the Authority and the Environment Agency to discuss sulphur dioxide issues specifically.

5.9 Option 9
Areas for industrial development

The Waterside area of the New Forest district is where the majority of large industry is located. As previously stated this area covers the coast line on Southampton Water from Calshot to Marchwood, (including Fawley). However whilst a number of large industries (12 permitted processes under PPC regulations) are in this area, the Waterside also contains residential properties, for example in Hythe and Holbury and is close to forestry land which is included in the recently designated New Forest National Park.

Whilst there is established industrial development along the Waterside, it would be fair to say that potentially future industrial developments may occur. For example, Marchwood Power Ltd. is in the process of building a power station within the Marchwood industrial estate.

Air quality is a material consideration when determining planning applications, therefore if further industrial developments with potential air quality issues were to be applied for in the vicinity of Fawley village then the Authority would ensure a detailed Environmental Impact Assessment was completed as part of the planning application. Such assessments are standard, however the Authority would have to ensure there was particular reference to potential sulphur dioxide emissions from further industrial developments and how the emissions may impact on the local area.

Due to the current situation of a declared Air Quality Management Area in Fawley for the likely exceedance of the 15 minute mean objective, Environmental Protection at New Forest District Council would probably oppose any industrial development if it were to emit sulphur dioxide at levels which may contribute to the current sulphur dioxide concentrations in the vicinity of Fawley. This is unless the industry could show that technology and abatement equipment would be utilised to successfully reduce sulphur dioxide emissions from their plant to a level that would not significantly impact on existing sulphur dioxide concentrations.

In addition to comments made by the Local Authority on planning applications for industrial developments, other consultees would include the Environment Agency, Natural England, neighbouring Local Authorities, and the relevant Parish Councils. Their comments would also be considered before the planning application was determined.

Option Summary

(i) to ensure future industrial developments in Fawley and the surrounding area which may impact on air quality in Fawley are sufficiently assessed.

5.10 Option 10
Increase public awareness of air quality issues

Whilst the Environmental Protection department within New Forest District Council has continued to fulfil its duty to review and assess air quality within its district, the Authority needs to ensure the public, council employees and council members are kept informed with regards to these issues.

Currently air quality information and continuous analyser results are available through the Authority's website; www.newforest.gov.uk and the necessary council committees and Parish Councils are informed on progress with regards to air quality issues. For example, officers regularly report to the New Forest Environmental Protection Liaison Committee.

However, further work expanding the theme of air quality, for example press releases and articles concerning alternative or public transportation within the New Forest needs to be implemented on a regular basis to ensure the public are more aware of air quality issues.

In order to achieve this, Environmental Protection officers will have to work closely with other departments within the Authority, officers in the Environment Agency, industry and local members.

Option Summary

(i) New Forest District Council to ensure information on air quality and other related topics is regularly reported and readily available to the public.

5.11 Option 11
Review air quality monitoring within the New Forest

Whilst New Forest District Council assesses air quality throughout its whole district following Government guidance[6], the monitoring of pollutants is undertaken at numerous sites which could potentially have exceedances of an air quality objective. This monitoring includes the use of nitrogen dioxide diffusion tubes at 47 sites throughout the district, oxides of nitrogen continuous analysers at Lyndhurst and Totton, sulphur dioxide continuous analysers at Holbury and Fawley and particulate continuous analysers at Totton and Holbury.

It is important however to regularly review, for example on an annual basis, the air quality monitoring programme to ensure monitoring is being undertaken at the most appropriate locations and using the correct monitoring method. For example, it may be more appropriate to model a potential hot spot area or hire monitors on a short term contract before considering either moving existing monitoring equipment or purchasing new equipment.

In addition, shipping along Southampton Water which may be travelling to the refinery's own terminals or proceeding up to Southampton docks will emit sulphur dioxide from the fuel they burn. In 2004 modelling work by Faber Maunsell[1] concluded that in Fawley 10% of sulphur dioxide was from shipping, with the remainder being emitted from industry. However this situation or Government guidance may change to include more informed monitoring or modelling for sulphur dioxide from shipping. If this were the case the Authority would have to consider changes in its monitoring regime.

Option Summary

(i) for New Forest District Council to regularly review its air quality monitoring strategy and to consider shipping emissions if guidance advises.

5.12 Option 12
Do nothing

The Environment Act 1995 places a duty on Local Authorities to assess air quality. If an exceedance of an air quality objective is likely, the Local Authority has a duty to declare an Air Quality Management Area. Once the declaration has been made, the Local Authority has to produce an Action Plan containing options which attempt to improve local air quality so pollutant concentrations are within the prescribed objectives.

The do nothing option is not considered to be an acceptable route in the case of the Fawley Air Quality Management Area as it is evident that options are available to reduce sulphur dioxide emissions.

6.0 COST / BENEFIT ANALYSIS

In order to assess the options outlined in Chapter 5 guidance[14] advises a basic cost benefit analysis is undertaken. This analysis is recommended in order to assist the Authority to evaluate the improvement in air quality against the cost of the proposed option.

It has previously been stated that the main source of sulphur dioxide in the vicinity of Fawley is from the Esso Petroleum oil refinery. The operator's permit for the refinery, as discussed, has specific conditions regarding the 15 minute mean objective for sulphur dioxide which is expanded upon within the permit in the form of emission limits and improvement programmes. The emission limits and programme of works have already been agreed between the regulator and operator, and are timetabled into the work schedule for the refinery and to a certain extent budgeted for by the operator.

Therefore a number of options will be progressed for the purposes of the operator meeting their permit conditions. As a result the outcome of a cost / benefit analysis has already been determined by the permit and therefore the draft Action Plan for Fawley will not include an actual cost / benefit analysis.

However, Table 6 does consider and compare all the proposed options in Chapter 5. The considerations include estimated impact of sulphur dioxide, timescale for works and non-sulphur dioxide impacts. The result is an attempt to rank the options, with the highest ranked options (i.e. having the lowest number) having the higher impact on current sulphur dioxide concentrations, in a shorter timescale with favourable non-sulphur dioxide impacts.

There are a number of points to note with regards to the table;

- the industrial process considered in the table is the refinery due to its significant contribution to ambient sulphur dioxide concentrations. The RWE npower power station has been ignored for the purposes of the table.
- unless there has been modelling or monitoring work undertaken the impact of each option on sulphur dioxide concentrations and other environmental parameters has been estimated.

Table 6

Table Showing Options Matrix.

Option (in the order discussed in the Action Plan)	Estimated Impact on Sulphur Dioxide	Timescale	Non Sulphur Dioxide Impacts	Rank
1. Relocation of industrial process	V. High	Extremely unlikely to proceed.	Better plant design and technology. Another location for the refinery may not have residential properties as close to site, but will result in local job losses at current location.	**14**
2. Changes to industrial process technology	High	Extremely unlikely to proceed with a complete change in process technology, however smaller plant upgrades likely.	May result in reduction in other pollutants and quieter plant.	**10**
3. Installation of industrial emission abatement equipment; **(i) SRU 3/4 (Super Claus Units)** **(ii) FCCU**	(i) High (ii) High	(i) In permit improvement programme (IC 29). Plan submitted by 30/09/10, works long term. (ii) In permit improvement programme (IC 5). Plan submitted by 31/03/08, works short term.	Refinery already operating efficiently however equipment will improve efficiency further. Relies on acceptance of the written plan by the EA.	**4** **3**
4. Changes in industrial operating pattern	Medium	Already operating. Update of the Air Quality Management Plan (IC 16) submitted by 30/09/08.	Relies on operators to respond to conditions and alarm to switch fuel type. Switching to gas from oil at SP4 currently may not always be an option.	**7**

Option	Estimated Impact on Sulphur Dioxide	Timescale	Non Sulphur Dioxide Impacts	Rank
5. Changes in industrial fuel; Energy study incl. conversion of SP4 to burn gas	High	In permit improvement programme (IC 17). Plan submitted by 31/12/08 works medium term.	Reduction in NOx, particulates and CO_2. Improvement to visual aspect of plume.	**1**
6. Reduction in emissions from industrial process (i) reduction in mass emission (ii) introduction of bubble limit (iii) air quality management plan	(i) High (long term limits) (ii) Medium (iii) Medium	(i) In permit. New limits come into effect immediately and reduce until 2016. (ii) In permit. Comes into effect immediately. (iii) In permit improvement programme (IC 14). Plan submitted by 30/09/08	All three points will improve relationship with public. Modelling work within the refinery AQMP should assist EA, Authority and operator to forward plan for air quality improvements.	**2** **5** **6**
7. Enforcement of permitted conditions	Low	Already in place	Good regulation improves faith of public, Authority and operator in EA.	**8**
8. Working with EA and industry	Low	Already in place, but improvements to system starting Jan '08	Improves working relationship between operator, Authority and EA.	**9**

Option	Estimated Impact on Sulphur Dioxide	Timescale	Non Sulphur Dioxide Impacts	Rank
9. Areas for industrial development	Low	Procedure already operational	Reduced impact of other industrial pollutants and operational noise from new processes.	**11**
10. Increase public awareness of air quality issues	Low	Annually starting April '08	Increased costs to NFDC to publicise AQ.	**12**
11. Review air quality monitoring within the New Forest.	Low	Annually starting April '08	Should keep AQ monitoring cost effective for NFDC.	**13**

Therefore in summary, the options could be presented in the ranked order shown in Table 7.

Table 7

Table Showing Options in Ranked Order.

Option	Impact	Lead Role	Rank
Changes in industrial fuel	Conversion from oil to gas in SP4 at the refinery to reduce SO_2 emissions from refinery.	Esso Petroleum	**1**
Reduction in mass emission	Reduction in the emissions of SO_2 from refinery.	Esso Petroleum	**2**
Installation of abatement equipment; FCCU	Reduction in the emissions of SO_2 from refinery.	Esso Petroleum	**3**
Installation of abatement equipment; SRU 3/4 (Super Claus Units)	Reduction in the emissions of SO_2 from refinery.	Esso Petroleum	**4**
Introduction of bubble limit	Reduction in the emissions of SO_2 from refinery.	Esso Petroleum	**5**
Air quality management plan	Improved management of emissions focusing on SO_2.	Esso Petroleum	**6**
Changes in industrial operating pattern	Plan to reduce the number of exceedances of the 15 min mean for SO_2.	Esso Petroleum	**7**
Enforcement of permitted conditions	To ensure industrial processes operate within their permitted conditions.	EA	**8**
Working with EA and industry	To improve communication.	NFDC / EA / Esso Petroleum	**9**
Changes to industrial process technology	Reduction in the emissions of SO_2 from refinery.	Esso Petroleum	**10**
Areas for industrial development	To ensure the impact of SO_2 emissions are considered.	NFDC	**11**
Increase public awareness of air quality issues	To improve communication.	NFDC	**12**
Review air quality monitoring	To ensure good monitoring results are collated.	NFDC	**13**
Relocation of industrial process	This will remain as an option but it is highly unlikely to ever be implemented.		**14**

7.0 CONSULTATION, MONITORING AND EVALUATION OF THE ACTION PLAN

7.1 Consultation

The draft Action Plan was put out for consultation for a period of 12 weeks commencing on the 25th February 2008 and ceasing on the 19th May 2008. The consultees are as follows;

Defra
Environment Agency
New Forest National Park Authority
Esso Petroleum Ltd.
Exxonmobil
RWE npower
New Forest Environmental Protection Liaison Committee
Southampton City Council
Test Valley Borough Council
Salisbury District Council
East Dorset District Council
Eastleigh Borough Council
Fawley Parish Council
Hythe and Dibden Parish Council
Marchwood Parish Council
New Forest District Council ; planning department

In addition the Authority presented the draft Action Plan to Fawley Parish Council. A consultation leaflet was also delivered to local residents in Fawley, which briefly outlined the aims of the Action Plan, the options under consideration and advises residents on how to view a copy of the draft Action Plan document. A return section on the leaflet enabled the public to forward their views.

The draft Action Plan was made available to the public via the Authority's website, with copies available for public viewing at the Authority's office at Appletree Court, Lyndhurst, Hampshire SO43 7PA and in Jubilee Hall in Fawley village.

7.2 Consultation Results

As a result of the consultation, comments were received from the following;

Defra
Environment Agency
Esso Petroleum Company Ltd.
Members of the public

On the whole the draft Action Plan for Fawley was well received.

The comments from Defra are shown in full in Appendix 4 however in summary Defra accepted the Action Plan and did not recommend any further alterations to the document.

The Environment Agency made some minor technical points and the Action Plan has been amended accordingly. In addition The Environment Agency specifically stated that it agreed with option 8, (namely the Authority working with the Environment Agency and Esso Refinery) and noted the Authority's confidence in the Environment Agency's air dispersion modelling work.

Esso Petroleum commented on the work already undertaken by the refinery in an attempt to reduce the number of exceedances of the 15 minute mean objective for sulphur dioxide which in their opinion have been successful in ensuring the objective has not been exceeded. As a result Esso Petroleum would like to discuss the criteria and timescale for revocation of the declared Air Quality Management Area.

Comments have also been forwarded regarding the fuel composition used at the refinery in 2005, which have been included in the Action Plan. In addition whilst Esso Petroleum supports option 8, the Authority working with the Environment Agency and Esso Refinery, they state that a quarterly meeting may be too frequent. The Authority will consider this opinion further.

As part of the consultation process New Forest District Council also consulted with the public. 280 consultation leaflets were delivered to properties and 15 responses were received (~5.3% of those consulted).

Whilst a number of residents asked specific questions to which the Authority will respond directly to the residents concerned, a number of points were forwarded. These included;

- A request to extend the Air Quality Management Area to include properties to the west and south west of Fawley (in Ashdown Hill and the Pentagon).
- Comments for regular public updates on the progress of the options within the Action Plan and the Improvement Conditions within the Esso Petroleum refinery permit.
- Further complaints regarding odour, fall-out and noise from the Esso Petroleum refinery.

With regards to the comments received, the Authority will not be extending the Air Quality Management Area for Fawley. Modelling work undertaken by the Authority in 2004, and subsequently by the Environment Agency and the Esso Petroleum refinery has concluded that the centre of Fawley village (in the location of the real time continuous analyser at Jubilee Hall) is the area most likely to be affected by sulphur dioxide emissions. Locations outside the village are unlikely to exceed the air quality objectives set for sulphur dioxide, therefore the Air Quality Management Area was set, after consultation, to the confines of Fawley village as shown on page 16.

However, if through future modelling and / or monitoring it is likely that air quality objectives will be exceeded outside the current Air Quality Management Area the Authority acknowledges it has a duty to either extend the existing Air Quality Management Area or declare an additional Area.

With regards to the request for regular public updates, option 10, (increasing public awareness of air quality issues), will include reports on the progress of the Action Plan. The Authority would also hope to include summaries on the progress of the improvement conditions within the permits for the industrial processes.

Whilst this Action Plan does not include a remit to tackle odour, fall-out and noise issues, the Authority will be forwarding these concerns onto the Environment Agency who is the regulatory authority for such complaints.

7.3 Monitoring and Evaluation

Following the consultation period the Authority has amended the draft Action Plan as necessary and implementation will commence following formal adoption by the Authority. The Action Plan will continue to be led by the Environmental Protection department at New Forest District Council, however it is highly likely that there will be considerable input from other authorities, for example the Environment Agency.

The implementation of the Action Plan will be closely linked with the progression towards fulfilling the permit conditions for the local industries, in particular for the Esso Refinery permit. However the implementation of other non-industrial options will be determined by District officers and Council members. Obviously this may result in a number of options being implemented in parallel.

A number of stages will be followed during the implementation of the Action Plan. In summary these are;

(i) Modelling / Feasibility Studies

A number of the options listed have already been modelled by the Environment Agency and / or the Esso Petroleum refinery in terms of air quality impacts for work programme in the permit improvement conditions. It is likely that through the updating of the Esso Refinery (IC 16) Air Quality Management Plan further air quality modelling work will be undertaken and reported to the Environment Agency. Such modelling work will assist the Authority in determining if the progression of the options is having the required impact on ambient sulphur dioxide concentrations.

New Forest District Council is unlikely to undertake its own modelling because any such work, either produced by or accepted by the Environment Agency for the purposes of satisfying operator's permit conditions, will satisfy the Authority.

(ii) Monitoring of Impact of Options

Once options are implemented the impact on sulphur dioxide and in particular the 15 minute mean objective will continue to be monitored using the real time continuous analysers located in Fawley (within the Air Quality Management Area) and Holbury (outside the Air Quality Management Area).

Given the monitoring of sulphur dioxide that has been undertaken in these locations since 2000 / 2001, there is a wealth of data which should assist officers in determining likely impacts on sulphur dioxide and possible trends in pollution concentrations.

(iii) Reporting on the Progress of the Action Plan

Local Authorities have a duty under the Environment Act 1995 to keep their Action Plans up to date which may include its revision. Therefore Local Authorities have to submit an annual Progress Report with regards to each Action Plan.

It is likely that following each Action Plan Progress Report there will be a report made to the Environment Agency, industrial processes, New Forest District Council and Fawley Parish Council for consultation and comment. The Action Plan and subsequent Progress Reports will be available via the Authority's website.

It is noted that during 2006 and 2007 (results to be reported in the Progress Report 2008) the number of exceedances of the 15 minute mean have been below the permitted 35 stated in the objective. It is too early to say whether this is purely due to the introduction of the alarm system outlined in Option 4 but nevertheless the indications are encouraging. However, before revocation of the Air Quality Management Area could be considered at least 5 years worth of data will be required to ensure that this positive trend continues.

In addition, throughout the implementation of the Action Plan for Fawley and assessment of air quality the Authority will continue to work with, consult (where necessary) and inform all interested parties.

REFERENCES

1. New Forest District Council – Detailed Modelling Study. June 2004. ***Faber Maunsell***

2. Expert Panel on Air Quality Standards – Sulphur Dioxide. ***Department of the Environment. 1996.***

3. www.naei.org.uk/emissions

4. www.environment-agency.gov.uk/business/444255/446867/255244/?lang=_e

5. www.defra.gov.uk/environment/ppc/envagency/pubs/index.htm

6. Local Air Quality Management. Technical Guidance LAQM.TG(03). ***Defra***

7. Fawley Refinery. Permit Number BR699IC. Permit with introductory note. Pollution Prevention and Control (England & Wales) Regulations 2000. ***December 2007. Environment Agency***

8. Fawley Power Station. Permit Number WP3535LZ. Permit with introductory note. Pollution Prevention and Control (England & Wales) Regulations 2000. ***May 2007. Environment Agency***

9. Adopted Local Plan, First Alteration. ***August 2005. New Forest District Council.***

10. Planning Policy Statement 23: Planning and Pollution Control. ***November 2004. Office of the Deputy Prime Minister.***

11. www.ukpia.com/industry_information/refining_uk_refineries/refineries/esso_refinery_fawley.aspx

12. www.rwenpower.com/cr/Fawley.aspx

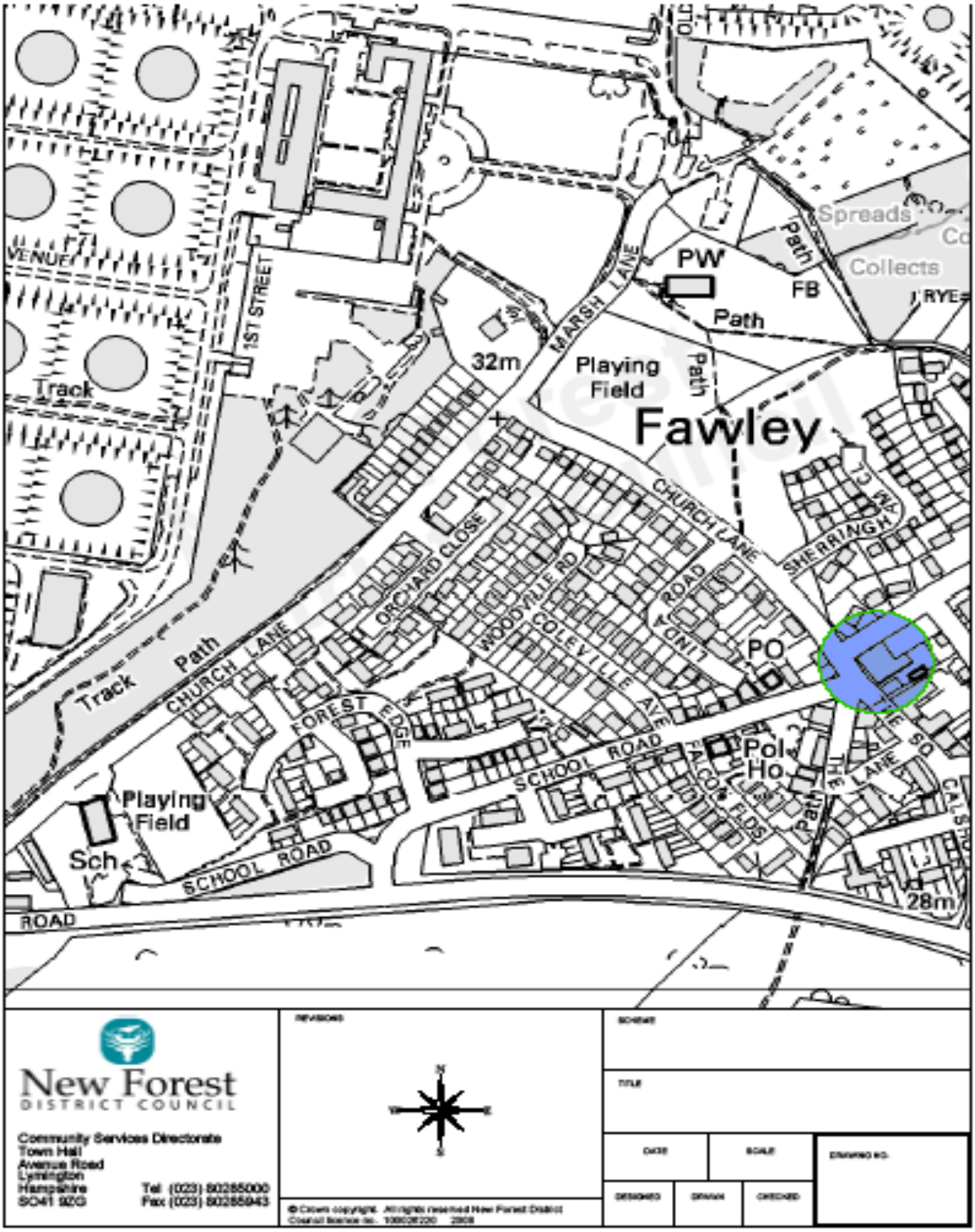
13. www.environment-agency.gov.uk/business/1745440/112913/

14. Air Quality action Plans: Interim Guidance for Local Authorities. ***NSCA. 2001***

APPENDICES

APPENDIX 1

Location of analyser



APPENDIX 2

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC1	The Site Protection and Monitoring Plan (SPMP), the subject of Condition2.8, shall include proposals to deal with issues identified within the ASR, specifically: Surveys, monitoring and maintenance of drains Surveys, monitoring and maintenance of other underground structures Surveys, monitoring and maintenance of bunds The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of these proposals within the SPMP.	Within 2 months of permit issue
IC2	The operator shall complete installation, operation and use of continuous emission monitors on release points SP4, PS/V3, PH2 and GTG/WHB and installation of the sampling points for release points PH1, PS2 and ENSR. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on completion of the above	31/12/07
IC3	The Operator shall submit a written report to the Agency following completion of the PV1 barometric system modifications. The report shall detail the environmental impact of the changes, including reductions in odour and the risk of blockage. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on completion of the above	31/12/07
IC4	The Operator shall submit a written report to the Agency detailing the impact of the modifications of the PV2 barometric sump on the effluent system; the results of trials of the "sewer sweep" system and plans for further development and improvement of that system. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on completion of the above. The plans shall be implemented by the operator from the date of approval by the Agency.	31/12/07
IC 5	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to achieve a reduction in the sulphur dioxide emission equivalent to not less than 70.5% from the FCCU regenerator, based on unabated emission levels. The plan shall include an option to re-assess BAT if necessary. The plan shall contain, as a minimum, dates for: (i) the implementation of any individual measures; (Iii) submission of a written report on the outcome of any trials; (iii) submission of a written report, if necessary, to the Agency for approval on the re-assessment of BAT; and (iv) implementation of final agreed abatement measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	31/03/08
IC 6	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to reduce the release of zinc from W3. Where appropriate the plan shall contain dates for implementation of individual measures. Requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	31/03/08
IC 7	A written report shall be submitted to the Agency providing an estimate of the reduction of phenol discharged through W1 that will occur through implementation of the project re-routing stripped sour water to the desalters The report shall contain dates for implementation of individual measures. The requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	31/03/08

IC8	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to ensure necessary monitoring and infrastructure is in place at the installation to allow the operator to demonstrate compliance against an hourly bubble limit for sulphur dioxide from 1 January 2009. Where appropriate the plan shall contain dates for the implementation of individual measures. . The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	31/03/08
IC9	A written procedure shall be submitted to the agency detailing the measures to be used so that monitoring equipment, personnel and organisations employed for the emissions to air monitoring programme shall have either MCERTS certification or accreditation in accordance with condition 3.6.3. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the procedure. The procedure shall be implemented by the operator from the date of approval in writing by the Agency	30/06/08
IC10	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to achieve an oil in water emission limit value of 2.5mg/litre applies as a daily average. Where appropriate the plan shall contain dates for implementation of individual measures. Requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/08
IC11	A written report shall be submitted to the Agency for approval reviewing the performance of the particulate abatement measures on the FCC regenerator. Where appropriate the report shall contain proposals for improvement and dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/08
IC12	"A written plan shall be submitted to the Agency for approval detailing the work to be undertaken to achieve MCERTS accreditation for effluent flow to release point(s) W1, W2 and W3 by 31 December 2008. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/08
IC13	A written plan shall be submitted to the Agency for approval detailing the method to be used to obtain, update and validate oxides of nitrogen (NOx) emission factors for all relevant plant the refinery installation. The plan shall demonstrate how the NOx factors will be used in the calculation of NOx emissions. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/08
IC 14	The operator shall submit a written report to the Agency following a review of the techniques used for ensuring good combustion at the flare tip during flaring events. The review shall include but not be limited to an appraisal of the security of the steam supply to the flares. The report shall include a plan with dates for the implementation of improvements identified. The notification requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/08
IC 15	A written plan shall be submitted to the Agency for approval detailing the measures necessary to validate the model used for predicting sulphur dioxide ground level concentration occurring as a result of releases from the refinery. The plan shall include a review of the meteorological monitoring equipment for provision of accurate wind speed, wind direction and temperature data for use in the model. The plan shall also include measures to be taken to install, commission and operate further offsite air quality monitoring stations if necessary. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	30/09/08
IC16	The operator shall update the present Air Quality Management Plan to include, as a minimum: ▪ Details of ambient air quality and meteorological monitoring equipment, techniques, methodologies and procedures including operation and calibration of equipment, and	30/09/08

	handling, quality assurance, quality control and reporting of data. Due regard shall be paid to the Guidance Note Defra (2003) Local Air Quality Management Technical Guidance LAQM TG4(03) and industry best practice ▪ Details of a 'pre-year assessment' method, used for demonstrating that the anticipated operating scenario will prevent, or where that is not possible, minimise, breaches of the air quality objectives using dispersion modelling ▪ Details of a method for 'continuous comparison' of the actual and predicted exceedances throughout the year, including any necessary amendments to the AQMP, to ensure the annual compliance objectives are achieved. This shall also include arrangements for advising the Agency of the implementation of the 'Emissions Management' technique for avoidance of exceedances and on the occurrence of an air quality measurement for sulphur dioxide over a period of 15 minutes, in excess of 266μg/m^3.; ▪ Details of an 'Annual review' of the AQMP, addressing all aspects including process management and releases to air, on and offsite monitoring, modelled impact and annual compliance. The review shall consider the success of the ongoing assessment throughout the year and propose any necessary improvements. ▪ Proposed date for submission of the Annual Review to the Agency each year. The notification requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	
IC17	A written report shall be submitted to the Agency detailing the results of the energy study carried out for the purpose of improving site wide efficiency and conversion of SP4 to full gas firing. The report shall include a plan with dates for approval for the implementation of improvements. The notification requirements of Condition 2.5.2 shall be deemed to have been complied with in submission of the plan. The plan shall be implemented by the operator from the date of approval in writing by the Agency.	31/12/08
IC 18	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to reduce the release of copper from W2. Where appropriate the plan shall contain dates for implementation of individual measures. Requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	31/03/09
IC19	A written report shall be submitted to the Agency for approval proposing and justifying an alternative to the outfall discharge sulphide testing and analysis at present carried out, and one that would most accurately reflect the impact on the receiving water. Where appropriate the report shall include proposals for improvement and dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. Proposals shall be implemented by the operator from the date of approval by the Agency...	31/03/09
IC 20	A written report shall be submitted to the Agency reviewing the results of suspended solids, COD and cyanide monitoring of the releases to water from OF1, OF2 and OF3 for the purpose of setting limits for these substances. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the report.	31/03/09
IC21	A written report shall be submitted to the Agency reviewing the results of the particulate releases from the GTG/HRSG CEMS, prior to the setting of a limit. The requirements of Condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency	31/03/09

IC22	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to achieve continuous measurement of sulphur dioxide of the emissions to air from the SRU. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/09
IC23	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to reduce the mass of sulphur dioxide released from combustion plants at the installation by 31 December 2010. The plan shall include detail on how higher sulphur fuels will be replaced with lower sulphur fuels, as well as any steps taken to increase energy efficiency which will also lead to reductions in sulphur dioxide emissions. A BAT assessment of the refinery fuel scrubbing facilities shall be programmed into the plan. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/09/09
IC24	The operator shall carry out a waste minimisation audit, having regard to section 2.4.2 of the Agency's IPPC Sector Guidance Note S1.02. A written report of the audit shall be submitted to the Agency and shall include a plan with dates for the implementation of improvements. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan.	30/09/09
IC25	The operator shall carry out a waste recovery and disposal options appraisal, having regard to section 2.6 of the Agency's IPPC Sector Guidance Note S1.02. A written report of the options appraisal shall be submitted to the Agency and shall include a plan with dates for the implementation of improvements. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan	30/09/09
IC26	The operator shall review the biopile working plan with reference to Sector Guidance Note S5.06 and, where necessary, amend written procedures. The operator shall submit a report to the Agency for approval summarising the amendments and any changes to the OIMS. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The amended procedures shall be implemented by the operator from the date of approval by the Agency.	31/12/09
IC27	The operator shall submit a written report to the Agency detailing: (i) an assessment of the effectiveness of the biopile treatment, including correlation of all relevant parameters; and (ii) an options appraisal for treatment of the material at present treated in the biopile. Where appropriate the report shall include proposals for improvement and dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. Proposals shall be implemented by the operator from the date of approval by the Agency...	31/12/09
IC28	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to reduce oxides of nitrogen (NOx) emissions from the refinery installation. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/06/10

IC29	A written plan shall be submitted to the Agency for approval detailing the measures to be taken to achieve a sulphur recovery efficiency of not less than 99% in accordance with the Sector Guidance Note S 1.02. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/09/10
IC30	A written plan shall be submitted to the Agency for approval detailing the results of a survey of bunding and other secondary containment measures for raw materials, intermediates, products and waste storage areas and the measures to meet the requirements of section 2.2.2 of Sector Guidance Note S 1.02 and other relevant extant guidance. Where appropriate the plan shall contain dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. The plan shall be implemented by the operator from the date of approval by the Agency.	30/09/10
IC31	A written report shall be submitted to the Agency detailing the results of 3:D thermal modelling of the discharges from W1 and 2. The report shall include an assessment of the heat load reductions throughout the year necessary to ensure, at the edge of the mixing zone, the temperature does not exceed ambient by more than 5ºC and with a maximum of 28ºC. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the report.	30/09/10
IC32	A written report shall be submitted to the Agency detailing the likely impact on the European sites during construction and operation of an outfall that extended into the main body of Southampton Water. Particular reference shall be made to Lamprey for the operational impact. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the report.	31/03/11
IC33	A written report shall be submitted to the Agency detailing a BAT options appraisal of measures for reducing the heat load in W1 and 2 discharges to meet the WQTAG60 guidance. The report shall include, but not be limited to: (i) identification of those areas in the Energy study that could reduce the heat load with quantification of the reductions; (ii) identification of those areas where air-fin cooling or cooling towers could be employed, with quantification of the reduction; (iii) assessment of the options for exporting low level heat for use beyond the site. Where appropriate the report shall include proposals for improvement and dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. Proposals shall be implemented by the operator from the date of approval by the Agency...	30/06/11
IC34	The operator shall complete installation of the sampling points for release point PS/V1. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on completion of the above.	31/12/11

IC35	A written report shall be submitted to the Agency comprising a BAT assessment of the quantities of VOC released to atmosphere during ship, rail and road tanker loading. Where appropriate the report shall include proposals for improvement and dates for the implementation of individual measures. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the plan. Proposals shall be implemented by the operator from the date of approval by the Agency.	30/06/12
IC36	A written report shall be submitted to the Agency for approval. The report shall contain a protocol for a monitoring programme to assess changes in acidification and eutrophication deposition and ecological effects at an appropriate Natura 2000 site. The protocol will include the selection of the Natura 2000 sites and a time scale for implementation of the programme. The notification requirements of condition 2.5.2 shall be deemed to have been complied with on submission of the report. The protocol detailed in the report shall be implemented by the Operator from the date of approval by the Environment Agency.	30/04/08

APPENDIX 3

Air Quality Management Procedure

Criteria 1

Wind speed >18 knots AND wind direction between 280^0 and 330^0.

Criteria 2

Jubilee Hall air quality monitor instantaneous SOx reading >20ppb

If **ONE** criteria is satisfied – **STAGE 1**

If **BOTH** criteria are satisfied – **STAGE 2**

STAGE 1

- **Switch SP4 to lower sulphur fuel oil if available**
    - Inform all relevant plant areas
    - Site manager to regularly monitor wind speed and direction using spreadsheet in DV

STAGE 2

- **Reduce fuel oil burning to a minimum or until modelled impact of emissions is within air quality limits**
    - Inform all relevant plant areas
    - Utilities to monitor SOx reading from Jubilee Hall
    - Site manager to regularly monitor wind speed and direction using spreadsheet in DV

STAND DOWN FROM THESE MEASURES AFTER 2 HOURS OF CRITERIA NOT BEING PRESENT

APPENDIX 4

March 2008

Re: Draft Air Quality Management Area Action Plan Fawley
New Forest District Council

The air quality issue(s):
The report contains a useful summary of the background to the air quality issues in Fawley and the review and assessment work carried out by New Forest District Council. In terms of air quality management the key issues are:

- Emissions in the Fawley area are associated with industrial processes.
- An Air Quality Management Area was declared in December 2005 for the whole of Fawley village as a result of exceedences of the 15min NAQS for SO_2.
- In 2005 there were 63 monitored exceedences of the 15 minute mean for SO_2 which equates to 28 over the permitted 35 exceedences allowed under the 15 minute mean objective.
- The improvement required to meet the 15 minute mean objective, based on the 2005 data was determined as 45%.
- 2006 results did not show an exceedence of the 15 minute mean objective for SO_2.
- 2005 weather conditions with a high proportion of strong westerly winds, which is not considered normal for the area, have been associated with the high level of exceedences in that year.
- The AQMA has been declared to address options to reduce the number of exceedences, should similar weather conditions to those in 2005 recur.
- Source apportionment analysis suggests that the main contributor to SO_2 emissions in the Fawley village area is the Esso Petroleum oil refinery. Emissions from other sources such as RWE npower, ExxonMobil Chemical and npower Cogen processes are significantly less than the permitted emission values.

The proposed AQAP:

As the exceedence is solely for the 15min SO_2 NAQS and this has been shown to be primarily due to industrial emissions, the draft AQAP concentrates on these issues, however some non-industrial based issues are also considered. Local and National policy developments are considered and a total of 12 options proposed.

The options being proposed are either currently being progressed as part of industrial permit conditions or are being forwarded for consideration as schemes which may decrease short term SO_2 concentrations within the AQMA.

The Council has no direct regulatory control over industrial emissions however, the report presents a number of positive and constructive actions and demonstrates close consultation with the Environment Agency over air quality in the locality.

Because the outcome of a cost / benefit analysis has been determined through the IPPC permit, it has been deemed unnecessary to include this in the Action Plan. However, a useful summary table ranking the impacts of SO_2 in the locality has been included.

The Report is presented with sufficient detail to allow implementation of the Action Plan post consultation and monitoring of progress thereafter. The report demonstrates the Councils commitment to addressing air quality in its area and monitoring of future progress .

Conclusion

The air quality issue in Fawley has been identified as specific to industrial emissions of SO_2 and hence, the Draft Action Plan focuses on proposals to ameliorate this problem. The proposals are appropriate and provided in sufficient detail to permit progress to be monitored.